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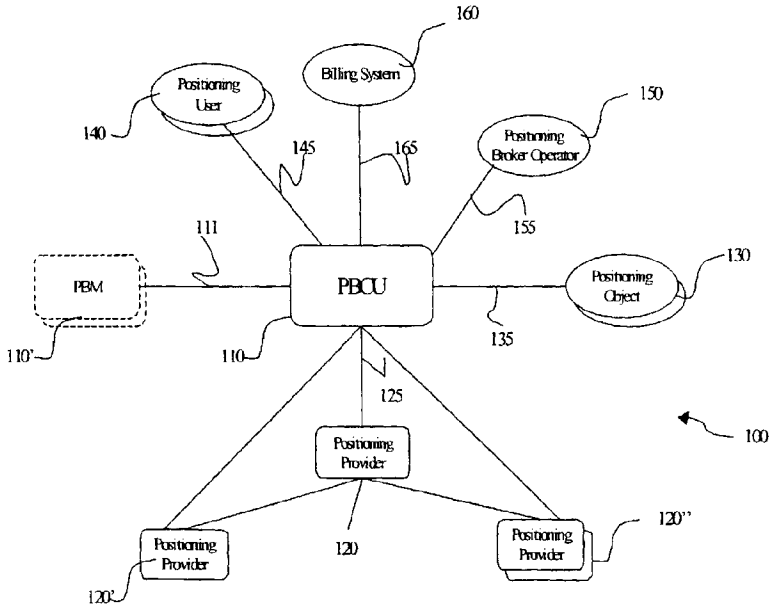

(57) Abstract: The present invention relates to a system for supplying at least one user (140) with position data on at least one object (130), said system comprising at least one central unit (110, 110') and one or several position providing units (120, 120', 120''). Said at least one user (140) is arranged to send a query regarding position of said at least one object (130), and that said central unit arranged to collect said position data on said at least one object (130) upon arrival and with regard to specifications of said query from said at least one position providing unit and supply said at least one user or another user with said position data.

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TITLE

METHOD AND ARRANGEMENT RELATING TO POSITIONING

TECHNICAL FIELD OF THE INVENTION

The present invention relates to a system for supplying at least one user with positioning data on at least one object, said system comprising at least one central unit and positioning providing unit.

BACKGROUND OF THE INVENTION

The fast development of the positioning techniques for positioning a subscriber equipped with a unit, which can be tracked and positioned, e.g. in wireless communications networks, allows possibilities to provide different types of services for different applications, situations and locations.

WO 9929130, for example, describes a method and system for determining the position of mobile stations based on Time Difference of Arrival measurements, which can be applied to digital mobile radiotelephone networks such as, for example, in the GSM. In a preferred embodiment, the network retrieves the identity of the serving cell and serving channel allocated for the mobile station whose position is to be determined, locates a plurality of base stations surrounding the serving cell, allocates a measurement channel for each of the surrounding base stations so located, and schedules a measurement time for the located surrounding base stations. Each base station then performs a Time of Arrival measurement at the scheduled measurement time, and reports the measurement information to the network. The network uses the Time of Arrival measurement information to calculate Time Difference of Arrival information, and thus derives the mobile station's position.

In EP 0930514, a plurality of ID transmitters that can issue an ID are provided in a building. A

center station registers position information that allows identification of the position of an ID transmitter for every different ID. A PHS mobile terminal measures the received field intensity of each repeater and each ID transmitter. The measured result is sent to the center station. The center station identifies the position of the mobile terminal according to the measured result and the position information. Accordingly, the accuracy of the location of a mobile terminal can be improved without increasing the number of repeaters.

The location of a mobile station in a mobile cellular communication system is determined, according to EP 0946075, by taking measurements of known transmissions from the mobile station at a plurality of base stations. The serving base station sends a control message to the mobile station to induce the mobile station to transmit a known bit sequence. The known bit sequence transmitted by the mobile station is received at a plurality of base stations. The time of arrival of the known bit sequence at each base station is determined and used to calculate the location of the mobile station.

The above mentioned documents, generally relate to different types of positioning.

SUMMARY OF THE INVENTION

There is a need for a system, a so-called broker system, that can handle different types of positioning information from different position information suppliers and supply different service levels for different users with regard to positioning information needed.

The main object of the present invention is to provide a system which mediates different types of information based on a subscriber's positioning information. In the following the system will be referred to as positioning broker system.

Another object of the present invention is provide a dynamic system, which secures the integrity of a positioning object, i.e. enable the positioning object to control if and/or when positioning users are allowed to position the object. Moreover, the system offers protection of

the identity of the positioning object.

Other objectives of the present invention are:

- Provide a uniform access method for positioning information that is independent of the type and supplier of the positioning provider(s);
- Provide positioning users with a single service access for positioning information;
- Simplify management of access rights when having multiple positioning providers by centralizing the authorization process and data to the positioning broker;
- Act as clearing house between positioning users, positioning broker operators, positioning objects and positioning providers.

With the positioning object is meant an object that can be positioned, e.g. a GSM mobile station, a GPS transponder etc. Positioning User implies a logical entity that is interested in the position of a positioning object, e.g. an SOS central. The Positioning Provider is a logical entity that has the capability to position a positioning object, e.g. a GSM network based mobile positioning centre.

For these reasons, in the initially mentioned system said at least one user is arranged to send a query regarding position of said at least one object, and that said at least one central unit is arranged to collect said position data on said at least one object upon arrival and with regard to specifications of said query from said at least one position providing unit and supply said at least one user or another user with said position data. Preferably, the system further comprises a billing system.

In one preferred embodiment the cental unit comprises at least one or several of a Logic Unit, Position Provider Selector, Position Log Handler, Positioning Broker Dispatcher, Positioning Acess Handler, Positioning Broker Clearing, Positioning Authorization Provider and a database.

The Logic Unit manages the operation of said central unit, Position Provider Selector selects a suitable Position Provider based on specified criteria, Position Log Handler logs positioning

broking actions performed by the system, Positioning Broker Dispatcher transfers a position request to a cooperating broker, Positioning Acess Handler handles the access to the system, Positioning Broker Clearing acts as clearing house between positioning users, positioning broker operators, positioning objects and positioning providers and Positioning Authorization Provider handles the authorization and security when accessing the system.

Preferably, said object is a GSM device having a SIM-Toolkit application provided in a GSM SIM card.

The invention also relates to method of providing at least one user in a broker system with position data on at least one object, said system comprising at least one central unit and position providing unit. The method comprises the steps of: said at least one user sending a query regarding position of said at least one object, collecting from said position providing unit by said at least one central unit said position data on said at least one object upon arrival and with regard to specifications of said query from said at least one position providing unit and supplying said at least one user or another user with said position data. The method comprises the further steps of identifying and authenticating said user so that unauthorized users/objects are not allowed to access the system. Preferably, the query contains at least one of user identity, password, object identity, quality and granularity of the positioning information, positioning method, validity, charging information. In order to protect the integrity of the user and/or object, the identity of both are arranged as unique aliases, that is the corresponding real identity of the user or object is unknown to all parties except for the positioning broker and the positioning provider. If alias is used a translation of an alias identity into a real identity, and the authorization of the usage of the alias identity, are handled by the positioning authorization provider in said central unit. The object defines and registers a number of alias object identities in the system. Preferably, the object defines and registers which user is allowed to use what alias identities when positioning the object. Moreover, the alias identity is the same as a real object identity, which is the identity that PP uses to position the object, e.g. the MSISDN for a GSM-based positioning. However, if the requested object identity is not handled by the accessed broker, a positioning dispatcher logic in said central unit transfers the request to a cooperating system then a single service access point for the user is enabled.

In order to further protect the integrity of the object, the positioning authorization provider checks that: the user is authorized by the positioning broker to access the positioning information of the requested object; and that the user is authorized by the object to access the positioning information of the requested object. In case of a successful authorization check, a positioning provider selector in said central unit determines a position provider unit, based on the parameters specified in the positioning query and the position provider units available for the user and object. When receiving a positioning query, the position provider unit only authenticates the central unit before executing the request. The position provider may subcontract additional position providers, and thus process/integrate the results given by different positioning mechanisms, in order to achieve positioning information of the requested accuracy. As result of successful positioning, the position provider returns the position to the central unit, which then transfers the position to the user as a response to the initially received query, and the position together with a time stamp is logged in a data base of the central unit. In case of an unsuccessful positioning, the central unit selects another position provider unit and send a new query to the same. Based on the parameters specified in the positioning query, a positioning may not be needed, and a latest known position, stored in a position database together with a time stamp can be returned. The outcome of the positioning request is processed in said central unit a charging scheme is calculated and output. At least substantial parts of access rights are stored in a control database and are managed by a positioning system operator. At least substantial parts of access rights are also controlled by the object via a position object access control management interface. An operator is arranged which can add and remove objects that an individual user can position, as well as add and remove position provider units that the user is allowed to utilize. The position provider unit can add and remove in a list in said central unit position provider units that are available for an object. Also, the object after authentication adds and removes in a list in said central unit at least one of: position provider units that are allowed to position the object, the positioning access right for each of specified position provider units, the provisioning providers that the object has been provisioned with by a positioning broker operator and alias identities and associate users to those identities. The object can access a positioning log to see when and by whom the object has been positioned. If the user is a device, such as a cellular phone, a GSM mobile unit or similar, an associated owner of the object is authorized as object.

Preferably, the object is a GSM terminal having a SIM-Toolkit (STK) application provided in a GSM SIM card.

Consequently, when the object selects a special STK function, the STK application requests positioning raw data from the GSM terminal that is used for calculating the position of the object that the GSM terminal collects the data and returns it to the STK application, then the STK application formats the data into a Short Message Service (SMS) message and sends it to the STK based positioning provider. Moreover, the STK application orders the GSM terminal to set up a call to a destination stored on the SIM card. The SMS message arrives to the Position Provider, which extracts the positioning raw data and together with other data stored in the Position Provider a position of the object is calculated. Preferably, the calculated position, together with the identity of the object and the requested service-id is sent the associated central unit, which receives and checks that the object is allowed to send the position to the selected service-id, and if the result is positive the position together with the user-id is sent to the service provider after translation of the service-id into an address. The address of the service provider is calculated by the central unit by translating the service identity into an address that can be used for a communication channel used between the central unit and the service provider. Moreover, the STK may allow the terminal to set up a call to a number associated with the menu choice. Preferably, at least one address is predefined in the SIM, for which address positioning data is sent. Then, every time the terminal user dials a number, the STK application is invoked and the dialled number is checked towards a list, and that if the dialled number is in the list, positioning raw data is collected and sent to the positioning provider. An end-user actively indicates that a positioning raw data is sent to a destination associated with a dialled number by adding a prefix or suffix to the dialled number, when a number is dialled, the STK application is invoked, which checks whether the number contains a prefix/suffix according to the defined format, if defined form, the positioning raw data is collected and sent to the positioning provide. If positioning data transfer is requested for a service provider associated with a number that is not registered in the system, the central unit returns an SMS-reject message to the terminal indicating that there is no positioning support associated with the dialled number.

In one embodiment a position user sends a message to the central unit, informing it that the

position of a wanted object is to be sent to a service provider, whereby the central unit determines the position of the object using positioning provider, by using network based positioning, dedicated terminals, etc., and then the position is sent to service provider. The user is the same as the object.

The invention also refers to an arrangement for controlling in a system for supplying at least one user with position data on at least one object, said system comprising at least one central unit and position providing unit. The arrangement comprises at least one or several of a Logic Unit, Position Provider Selector, Position Log Handler, Positioning Broker Dispatcher, Positioning Access Handler, Positioning Broker Clearing, Positioning Authorization Provider and a database. The Logic Unit manages the operation of said arrangement, Position Provider Selector selects a suitable Position Provider based on specified criteria, Position Log Handler logs positioning broking actions performed by the system, Positioning Broker Dispatcher transfers a position request to a cooperating broker, Positioning Acess Handler handles the access to the system, Positioning Broker Clearing acts as clearing house between positioning users, positioning broker operators, positioning objects and positioning providers and Positioning Authorization Provider handles the authorization and security when accessing the system.

The invention also refers to a method for a network device to obtain position data from a plurality of remote position provider server via a computer network, comprising: sending on a computer network a first message having a request for a position of a positioned object, receiving at said plurality of remote position provider servers the first message, sending on the computer network a second message having position data on said object, and receiving said second message on the network device the second message including said position data and providing to a client terminal said position data.

The invention also relates to a method of facilitating the sail of position information in a position broker system, wherein at least one user in requires position data on at least one object, said system comprising at least one central unit and one or several position providing units, wherein said at least one user is allowed to send a query regarding position of said at least one

object, from said one or several position providing units by said at least one central unit said position data on said at least one object is collected upon arrival and with regard to specifications of said query from said at least one position providing unit and said at least one user or another user is provided with said position data, and a billing system is initiated for charging said user for said position data.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following, the invention will be further described in a non-limiting way with reference to the accompanying drawings in which:

Fig. 1 is a system overview block diagram,

Fig. 2 is a block diagram over a preferred embodiment of the internal entity of the positioning broker central unit,

Fig. 3 is a flow diagram showing the steps performed by the positioning broker central unit,

Fig. 4 is the continuation of the flow diagram of fig. 3,

Fig. 5 is a flow diagram showing the positioning steps,

Fig. 6 is a block diagram illustrating the steps of a positioning query,

Fig. 7 is a block diagram illustrating the steps of another positioning query, and

Figs. 8-12 are flow charts over positioning steps according to different embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENT

The positioning broker system 100, according to one preferred embodiment of the invention, as shown in fig. 1, comprises the following parts: the core of the system is a Positioning broker Central Unit (PBCU) 100, to which are connected one or several Position Providers (PP) 120/120'/120", at least one Positioning Object (PO) 130 and at least one Positioning User (PU). Generally, the PBCU is administrated by a Positioning broker Operator (PBO) 150. Moreover, a Billing System (BS) 160 can be integrated in the system. Moreover, the system may also be in contact with additional positioning broker systems 110'.

The PBCUs 110 and 110' communicate by means of a Positioning Inter-Broker Protocol (PIBP) 115. For communication between the PBCU and PPs 120, a Positioning Provider Access Protocol (PPAP) 125 is used. Positioning Object Access Control Management Interface 135 is used between the PBCU and POs 130. The communication between PBCU and the PUs 140 provided through Positioning Broker Access Protocol (PBAP) 145. Positioning Broker Operator Access Control Management Interface PBOAC 155 is used between the PBCU and PBOs 150. Finally, Positioning Charging Data Output Protocol PCDOP 165 is used when PBCU and BS 150 inter-communicate.

The PBCU 110 supervises the essential functions of the broker system, provides access to the system, act as an intermediary between the users, position providers, operators and objects etc.; other functions of the PBCU will be disclosed below. PPs 120 provide the system with the position of the POs 130. The positioning may comprise any known type of positioning, such positioning within a GSM, AMPS, etc. network, GPS or GLASNOSS positioning and so on. PU 140 is supplied by the positioning information on PO from the system. PBO 150 operates the system and may also act as a service provider. BS 160 is used for economical transactions between the PBCU, PO, PU and PBO.

In one preferred embodiment, the PBCU 210 as illustrated in fig. 2, comprises a Central Positioning Broker Logic (CPBL) 211, Position Provider Selector (PBS) 212, Position Log Handler (PLH) 213, Positioning Broker Dispatcher (PBD) 214, Positioning Acess Handler (PAH) 215, Positioning Broker Clearing House (PBC) 216 and Positioning Authorization Provider (PAP) 217. Also, a database 218 is arranged for storing relevant data.

CPBL 211 manages the operation of the PBCU. PBS 212 selects a suitable Position Provider based on specified criteria. The actions for positioning broking performed by the system are logged by means PLH 213. The PBD 214 can transfer a position request to a cooperating broker via a positioning inter-broker access protocol. PAH 215 handles the access to the system. PAP 217 handles the authorization and security when accessing to system. PBC 216 acts as clearing house between positioning users, positioning broker operators, positioning objects and positioning providers.

The following non-limiting example discloses the operation of the system in conjunction with the flow charts of figs. 3, 4 and 5:

An external user of the position information, a PU 140, queries 300 via a PBAP the positioning broker for the position of a PO 130. Normally, the PU 140 is identified and authenticated 305 by the positioning broker, but, as a special case, an anonymous user can also be handled. Authentication can be handled in many ways, e.g. using passwords, digital signatures, etc.

The query can contain multiple parameters such as PU 140 identity, password, PO 130 identity (mandatory), quality and granularity of the positioning information, positioning method, validity (time, prediction), charging information, etc. As an alternative, positioning requests for multiple POs 130 can be included in one (batch) message.

In order to protect the integrity of the involved parties, the identities of both PU 140 and PO 130 can be aliases, that is the corresponding real identity of the user or object is unknown to all parties except for the positioning broker and the positioning provider. The translation 310 of an alias identity into a real identity, and the authorization of the usage of the alias identity, are handled by the positioning authorization provider 217 (integral part of the positioning broker).

A PO 130 can define and register an arbitrary number of fictive object identities in the positioning broker, as well as define and register which PUs 140 can use what alias identities when positioning the object. An alias identity must be unique that is a PO 130 cannot register an alias identity that already is registered by another PO 130.

As a special case, the alias identity can be the same as the real object identity. The real identity is the identity that PP uses to position the object, e.g. the MSISDN (Mobile Subscriber ISDN number) for a GSM-based positioning.

If the requested PO 130 identity is not handled by the accessed broker, the positioning dispatcher logic (integral part of the positioning broker) can transfer 510-540 the request to a cooperating broker via a positioning inter-broker access protocol. This enables a single service access point for the PU 140, while opening up for an environment with multiple brokers

providing worldwide coverage of POs 130 in a secure and controlled way.

In order to further protect the integrity of the PO 130, the positioning authorization provider checks that:

- the PU 140 is authorized by the positioning broker to access the positioning information of the requested object, step 320; and
- the PU 140 is authorized by the PO 130 to access the positioning information of the requested object, step 325.

The authorization check may result in an interactive dialogue with the PU 140. Furthermore, the authorization provider does not need to have any connection to the positioning mechanism used by the PP(s).

If the authorization check is successful, the POS 212 (integral part of the positioning broker) determines 330 which PP 120 to use based on the parameters specified in the positioning query and the PPs available for the PU 140 and PO 130. A query is then sent to the selected PP via the POAP.

When receiving the positioning query 400, the PP only has to authenticate the positioning broker before executing the request. Authorization is not needed in the PP since all authorization is performed by the positioning broker.

A PP 120 can "subcontract" other PPs 120'/120", and thus process/integrate the results given by different positioning mechanisms, in order to achieve positioning information of the requested accuracy.

If the positioning is successful 410, the PP returns the position to the broker, which then transfers the position to the PU 140 as a response to the initially received query. The position together with a time stamp is logged in a data base 218 of the positioning broker

If the positioning is not successful, the broker can optionally select 415 another PP (using

another positioning mechanism) and send a new query to the chosen PP.

Based on the parameters specified in the positioning query, a positioning may not be needed, but for example the latest known position (stored in the position database 218 together with a time stamp) can be returned 420, 425 as a result to the PU 140. As an example, if a query states that the requested position information may not be older than X time units, e.g. minutes, and the latest known position stored in the position database is recent enough, a new positioning is not needed, but the latest known position is returned.

The outcome of the positioning request is processed 430, 435 by the PBC 216 (integral part of the positioning broker), which calculates and outputs 440 charging data via the positioning charging data output protocol. The positioning charging data output data enables financial settlement between the positioning broker, PU 140, PO 130, and the PP for the used services, e.g. through PB 160.

All access rights are stored in the positioning broker control database (integral part of the positioning broker) and are managed by the positioning broker operator via the positioning broker operator access control management interface, as well as by the PO 130 via the position object access control management interface.

The PBO can add and remove the PO 130s that an individual PU 140 can position, as well as add and remove PPs that the PU 140 is allowed to utilize. The PP can also add and remove PPs that are available for the PO 130.

The PO 130 can, after authentication, add and remove PUs 140 that can be allowed to position the object, as well as enable and disable the positioning access right for each of these specified PUs 140. In addition, the PO 130 can enable/disable the provisioning providers that the object has been provisioned with by the positioning broker operator. Furthermore, the PO 130 can add and remove alias identities and associate PUs 140 to those identities. Finally, the PO 130 can access the positioning log, i.e. see when and by whom the object has been positioned.

If the PO 130 is a device, such as a cellular phone, a GSM mobile unit or similar, the associated "owner" of the object can be authorized to access the PO 130 access control management interface. In one preferred embodiment, the associated owner of the PO 130 is seen as an integral part of the object.

The PU 140 can, after authentication, change the password (for authentication) via the PBAP.

The above described steps are illustrated briefly in fig. 6 in conjunction with a non-limiting example. According to fig. 6 a subscriber of a cellular phone 130 (positioning object), which also is subscriber of the positioning services, active within, e.g. a GSM network sends a message for help (e.g. after an accident) to an alarm central, i.e. the positioning user (police, emergency centre etc.). If the subscriber is not aware of his position, a query 601 is directed by the alarm central 140 to PBCU 110, which sends 602 a positioning query to a PP 120. The PP in this case is a GSM position provider which through an appropriate method positions the cellular phone directly or fetches 603, 604 a position from the positioning network 120' and sends back 605 data to PBCU. The PP provides 605 PBCU with position data, which is transmitted 606 to the alarm central, which lunches suitable actions. Then, the financial data is sent 607 to BS 160, which charges the subscriber. However, if the authentication of PU is not successful, the query 601' results in a rejection 602'. The PBCU can also engage 608 other broker systems 110' or be engaged by other broker systems for positioning services, e.g. situated in other networks.

It is also possible to commission a positioning object (or rather the associated owner/subscriber of the object) to push the position of the object to a PU so that the PU can provide the object (or rather the associated owner of the object) with a service that utilizes the position of the object. Moreover, it is possible to secure the integrity of the positioning object, i.e. allow the positioning object to control if and/or when providing the position to the user. It is also possible to enable the PBO to manage which positioning objects are allowed to send the position to what users.

When for example using a GSM terminal 720 as PO, GSM specific methods can be used for

trigging a positioning procedure, e.g. through:

- Selecting a service provider in a special terminal menu;
- Assigning special numbers for which the positioning procedure shall be initiated;
- Appending/suffixing a special character to a dialled number, e.g.#, when to invoke the positioning procedure.

Preferably, a SIM-Toolkit (STK) 722 application is provided in a GSM SIM card 721. The SIM-card is put into the GSM phone. The SIM-card together with the GSM phone constitutes a PO.

The sending of positioning data to a service provider can be triggered in different ways, which is shown as an example in fig. 7, and described below in conjunction with the flow charts of figs. 8-12 :

1) (Fig. 10) When the PO selects a special STK menu choice 1010 (e.g. "Call Road Assistance"), the STK application requests 1020 positioning raw data from the GSM terminal (e.g. served cell, etc.) that can be used for calculating the position of the object. The GSM terminal collects the data 1030 and returns it to the STK application. The STK application then formats the data 1040 (positioning raw data, A-number [identifying the positioning object], service-id [associated with the menu choice]) into a Short Message Service (SMS) message and sends 701, 1050 the SMS to the GSM STK based positioning provider (address stored on SIM). The STK application can optionally also order the GSM terminal to set up a call 701b, 1060 to a destination also stored on the SIM (in this example the phone number to Road Assistance). When the SMS message arrives to the PP 1110, it extracts the positioning raw data and together with other data stored in the PP (e.g. cell database, etc.) a position of the PO is calculated 1120. The position, together with the identity of the PO and the requested service-id (Road assistance) is then sent 702, 1130 to the associated PBCU. PBCU receives 1210 and -checks 1220 that the PO is allowed to send 703 the position to the selected service-id (road assistance), and if the result is positive the position together with the user-id (could be alias id 1230) is sent 1260 to the service provider after translation 1250 of the

service id into an address. The address of the service provider is calculated by PBCU by translating the service identity into an address that can be used for the communication channel (e.g. TCP/IP) used between the positioning broker and the service provider. If the alias is used, the object id is translated 1240 into alias before sending the message to the service provider.

If the PO is not allowed to send the position to the selected service provider, or the selected service provider is not known by the PBCU, the PBCU sends an SMS message to the PO indicating that the requested service is disallowed.

2) (Fig. 8) Another triggering method is to predefine in the SIM, a number of addresses (numbers) for which positioning data shall be sent. Every time the user dials a number 810, the STK application is invoked and the dialed number is checked towards the list 820. If the dialed number is in the list, positioning raw data is collected 830 and sent to the positioning provider and the same procedure as above (1) is followed 840, 850 with the exception that the dialed number is used as service id. Immediately after sending the SMS to the position provider, the STK lets the phone set up 860, the call according to the dialed number.

3) (Fig. 9) A third triggering method is to let the end-user indicate that position shall be sent to the destination associated with the dialled number by adding a prefix or suffix (e.g. hash mark or star) to the dialled number 910. When a number is dialled, the STK application is invoked and it checks 920 whether the number contains a prefix/suffix according to the defined format. If yes, the positioning raw data is collected 930 and sent to the positioning provider and the same procedure as above (1) is followed with the exception that the dialed number is used as service id. Immediately after sending the SMS to the position provider.

Although a GSM phone is used as an example, it is clear that any other entity that can provide connection to the positioning provider/broker in some way, e.g. a PC-application running on a portable PC that is connected to a GPS and a GSM phone, can be used for transmitting of position data to a service provider (via a positioning provider and a positioning broker).

In yet another case, a position user (in this case the same as the object) can send a message to the PBCU, informing the PBCU that he wants the position of an object to be sent to a service provider. As an example the position user/object can send an SMS from a mobile phone to the positioning broker. After authentication, the positioning broker then determines the position of object using a positioning provider as above. The position broker then sends the position to the selected service provider (e.g. SOS).

The invention is not limited the shown embodiments but can be varied in a number of ways without departing from the scope of the appended claims and the arrangement and the method can be implemented in various ways depending on application, functional units, needs and requirements etc.

CLAIMS

1. A system for supplying at least one user (140) with position data on at least one object (130), said system comprising at least one central unit (110, 110') and one or several position providing units (120, 120', 120''),
characterised in
that said at least one user (140) is arranged to send a query regarding the position of said at least one object (130), and that said at least one central unit is arranged to collect said position data on said at least one object (130) upon arrival and with regard to specifications of said query from said one or several position providing units and supply said at least one user or another user with said position data.

2. The system according to claim 1,
characterised in
that it further comprises a billing system (160).

3. The system according to claim 1,
characterised in
that said cental unit (110, 210) comprises at least one or several of a Logic Unit (CPBL) (211), Position Provider Selector (PBS) (212), Position Log Handler (PLH) (213), Positioning Broker Dispatcher (PBD) (214), Positioning Acess Handler (PAH) (215), Positioning Broker Clearing (PBC) (216), Positioning Authorization Provider (PAP) (217), and a database (218).

4. The system according to claim 1,
characterised in
that said central unit (110, 210) is arranged to communicate with other central units (110') in other systems by means of a Positioning Inter-Broker Protocol (PIBP) 115.

5. The system according to claim 1,
characterised in
that said central unit (110, 210) is arranged to communicate with a position provider unit (120),

a Positioning Provider Access Protocol (PPAP) (125).

6. The system according to claim 1,
characterised in
that said central unit (110, 210) is arranged to communicate with an object (130) through a Positioning Object Access Control Management Interface.

7. The system according to claim 1,
characterised in
that said central unit (110, 210) is arranged to communicate with a user (140) through Positioning Broker Access Protocol (PBAP) (145).

8. The system according to claim 2,
characterised in
that said central unit (110, 210) is arranged to communicate with an operator (150) through Positioning Broker Operator Access Control Management Interface (155).

9. The system according to claim 2,
characterised in
that said central unit (110, 210) is arranged to communicate with a billing system (160) through a Positioning Charging Data Output Protocol (165).

10. The system according to claim 3,
characterised in
that Logic Unit (CPBL) (211) manages the operation of said central unit, Position Provider Selector (PBS) (212) selects a suitable Position Provider based on specified criteria, Position Log Handler (PLH) (213) logs positioning broking actions performed by the system, Positioning Broker Dispatcher (PBD) (214) transfers a position request to a cooperating broker, Positioning Acess Handler (PAH) (215) handles the access to the system, Positioning Broker Clearing (216) acts as clearing house between positioning users, positioning broker operators, positioning objects and positioning providers and Positioning Authorization Provider (217)

handles the authorization and security when accessing the system.

11. The system according to claim 1,
characterised in
that said object is a GSM device (720) having a SIM-Toolkit application (722) provided in a GSM SIM card (721).

12. The system according to claim 1,
characterised in
that said positioning unit is a positioning unit within a one or several of GSM. AMPS, other cellular networks, GPS or GLASNOSS positioning.

13. A method of providing at least one user (140) in a broker system with position data on at least one object (130), said system comprising at least one central unit (110, 110') and one or several position providing units (120, 120', 120"),
characterised by

- said at least one user (140) sending a query regarding position of said at least one object (130),
- collecting from said one or several position providing units by said at least one central unit said position data on said at least one object (130) upon arrival and with regard to specifications of said query from said at least one position providing unit and
- supplying said at least one user or another user with said position data.

14. The method of claim 13,
characterized by
the further steps of identifying and authenticating said user.

15. The method according to any of claims 13-14,
characterized in
that said query contains at least one of user (140) identity, password, object (130) identity,

quality and granularity of the positioning information, positioning method, validity, charging information.

16. The method according to any of claims 13-15,
characterized in
that in order to protect the integrity of the user and/or object, the identity of both are arranged as unique aliases, that is the corresponding real identity of the user or object is unknown to all parties except for the positioning broker and the positioning provider.

17. The method of claim 16,
characterized in
that a translation of an alias identity into a real identity, and the authorization of the usage of the alias identity, are handled by the positioning authorization provider (217) in said central unit.

18. The method of claim 16,
characterized in
that the object (130) defines and registers a number of alias object identities in the system.

19. The method of claim 16,
characterized in
that the object defines and registers which user (140) is allowed to use what alias identities when positioning the object.

20. The method according to any of claims 13-19,
characterized in
that the alias identity is the same as a real object identity, which is the identity that PP uses to position the object, e.g. the MSISDN for a GSM-based positioning.

21. The method according to any of claims 13-20,
characterized in
that if the requested object identity is not handled by the accessed broker, a positioning

dispatcher logic in said central unit transfers the request to a cooperating system

22. The method of claim 21,
characterized in
that a single service access point for the user is enabled.

23. The method according to any of claims 13-22,
characterized in
that in order to further protect the integrity of the object, the positioning authorization provider checks that: the user is authorized by the positioning broker to access the positioning information of the requested object; and that the user is authorized by the object to access the positioning information of the requested object.

24. The method according to any of claims 13-23,
characterized in
that in case of a successful authorization check, a positioning provider selector (212) in said central unit determines a position provider unit, based on the parameters specified in the positioning query and the position provider units available for the user and object.

25. The method according to any of claims 13-24,
characterized in
that when receiving a positioning query, the position provider unit only authenticates the central unit before executing the request.

26. The method according to any of claims 13-25,
characterized in
that the position provider subcontracts additional position providers (120', 120"), and thus process/integrate the results given by different positioning mechanisms, in order to achieve positioning information of the requested accuracy.

27. The method according to any of claims 13-26,

characterized in

that as result of successful positioning, the position provider returns the position to the central unit, which then transfers the position to the user as a response to the initially received query, and the position together with a time stamp is logged in a data base (218) of the central unit.

28. The method according to any of claims 13-27,

characterized in

that in case of an unsuccessful positioning, the central unit selects another position provider unit and send a new query to the same.

29. The method of claim 15,

characterized in

that based on the parameters specified in the positioning query, a positioning may not be needed, and a latest known position, stored in a position database (218) together with a time stamp can be returned

30. The method of claim 13,

characterized in

that the outcome of the positioning request is processed in said central unit a charging scheme is calculated and output.

31. The method of claim 13,

characterized in

that at least substantial parts of access rights are stored in a control database and are managed by a positioning system operator.

32. The method of claim 31,

characterized in

that said at least substantial parts of access rights are also controlled by the object via a position object access control management interface.

33. The method according to any of claims 13-32,

characterized in

that an operator is arranged which can add and remove objects that an individual user can position, as well as add and remove position provider units that the user is allowed to utilize.

34. The method of claim 13,

characterized in

that the position provider unit adds and removes in a list in said central unit position provider units that are available for an object.

35. The method of claim 13,

characterized in

that the object after authentication adds and removes in a list in said central unit at least one of: position provider units that are allowed to position the object, the positioning access right for each of specified position provider units, the provisioning providers that the object has been provisioned with by a positioning broker operator and alias identities and associate users to those identities.

36. The method of claim 13,

characterized in

that the object can access a positioning log to see when and by whom the object has been positioned.

37. The method according to any of claims 13-36,

characterized in

that if the user is a device, such as a cellular phone, a GSM mobile unit or similar, an associated owner of the object is authorized as object.

38. The method of claim 13,

characterized in

that the object is a GSM terminal having a SIM-Toolkit (STK) application provided in a GSM

SIM card.

39. The method of claim 38,

characterized in

that when the object selects a special STK function, the STK application requests positioning raw data from the GSM terminal that is used for calculating the position of the object

that the GSM terminal collects the data and returns it to the STK application,

that the STK application then formats the data into a Short Message Service (SMS) message and sends it to the STK based positioning provider.

40. The method of claim 39,

characterized in

that the STK application orders the GSM terminal to set up a call to a destination stored on the SIM card.

41. The method of claim 39,

characterized in

that the SMS message arrives to the Position Provider, which extracts the positioning raw data and together with other data stored in the Position Provider a position of the object is calculated.

42. The method of claim 41,

characterized in

that the calculated position, together with the identity of the object and the requested service-id is sent the associated central unit, which receives and checks that the object is allowed to send the position to the selected service-id, and if the result is positive the position together with the user-id is sent to the service provider after translation of the service- id into an address.

43. The method of claim 42,

characterized in

that the address of the service provider is calculated by the central unit by translating the service

identity into an address that can be used for a communication channel used between the central unit and the service provider.

44. The method of claim 39,
characterized in
that the STK allows the terminal to set up a call to a number associated with the menu choice.

45. The method of claim 38,
characterized in
that at least one address is predefined in the SIM, for which address positioning data is sent.

46. The method of claim 44,
characterized in
that every time the terminal user dials a number, the STK application is invoked and the dialled number is checked towards a list, and that if the dialled number is in the list, positioning raw data is collected and sent to the positioning provider.

47. The method of claim 38,
characterized in
that an end-user actively indicates that a positioning raw data is sent to a destination associated with a dialled number by adding a prefix or suffix to the dialled number, that when a number is dialled, the STK application is invoked, which checks whether the number contains a prefix/suffix according to the defined format, if defined form, the positioning raw data is collected and sent to the positioning provide

48. The method of claim 47,
characterized in
that if positioning data transfer is requested for a service provider associated with a number that is not registered in the system, the central unit returns an SMS-reject message to the terminal indicating that there is no positioning support associated with the dialled number.

49. The method of claim 38,

characterized in

that a position user sends a message to the central unit, informing it that the position of a wanted object is to be sent to a service provider, whereby the central unit determines the position of the object using positioning provider, by using network based positioning, dedicated terminals, etc., and then the position is sent to service provider.

50. The method of claim 49,

characterized in

that the user is the same as the object.

51. An arrangement for controlling in a system for supplying at least one user (140) with position data on at least one object (130), said system comprising at least one central unit (110, 110') and position providing unit (120, 120', 120''),

characterised in

that said arrangement (110, 210) comprises at least one or several of a Logic Unit (CPBL) (211), Position Provider Selector (PBS) (212), Position Log Handler (PLH) (213), Positioning Broker Dispatcher (PBD) (214), Positioning Acess Handler (PAH) (215), Positioning Broker Clearing (PBC) (216), Positioning Authorization Provider (PAP) (217), and a database (218).

52. The arrangement of claim 50,

characterised in

that said Logic Unit (CPBL) (211) manages the operation of said arrangement, Position Provider Selector (PBS) (212) selects a suitable Position Provider based on specified criteria, Position Log Handler (PLH) (213) logs positioning broking actions performed by the system, Positioning Broker Dispatcher (PBD) (214) transfers a position request to a cooperating broker, Positioning Acess Handler (PAH) (215) handles the access to the system, Positioning Broker Clearing (216) acts as clearing house between positioning users, positioning broker operators, positioning objects and positioning providers and Positioning Authorization Provider (217) handles the authorization and security when accessing the system.

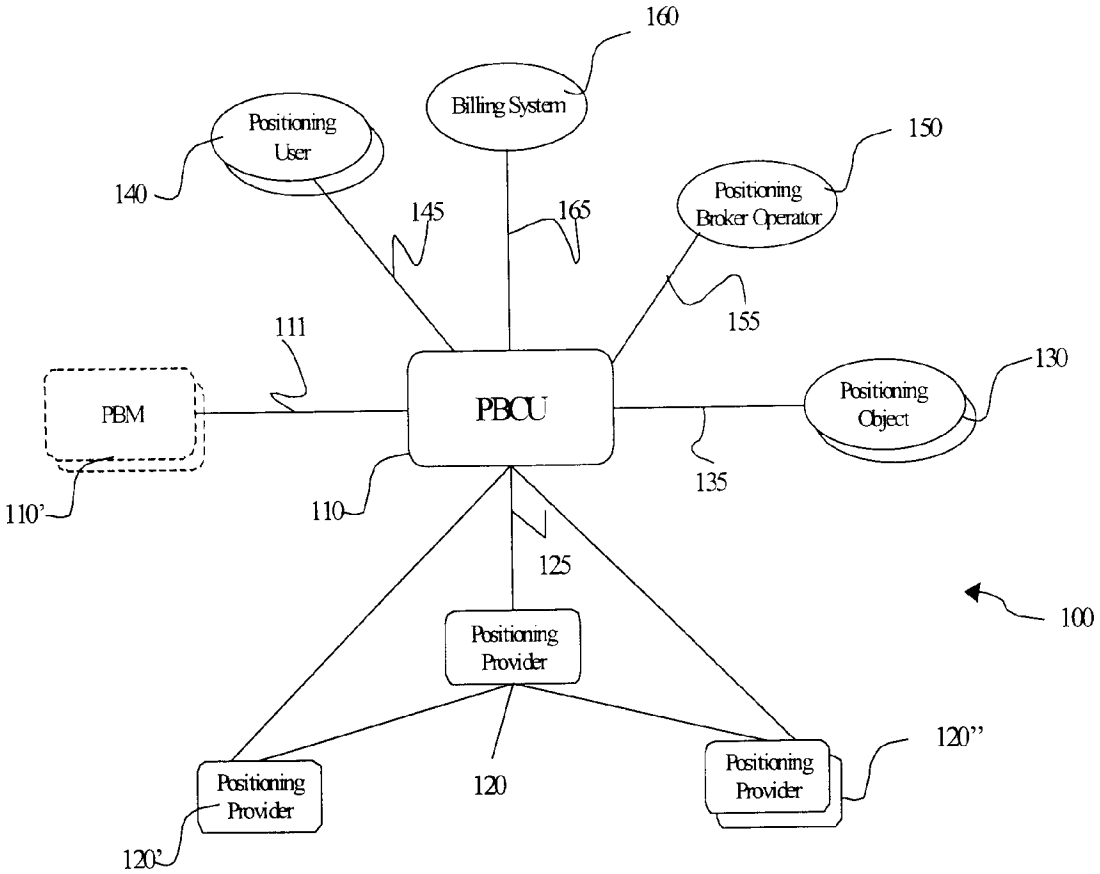

160
Billing System
Positioning User
140
145
165
150
Positioning Broker Operator
155
111
PBM
PBCU
130
Positioning Object
135
110'
110
125
100
Positioning Provider
120''
Positioning Provider
120
Positioning Provider
120'

Fig. 1

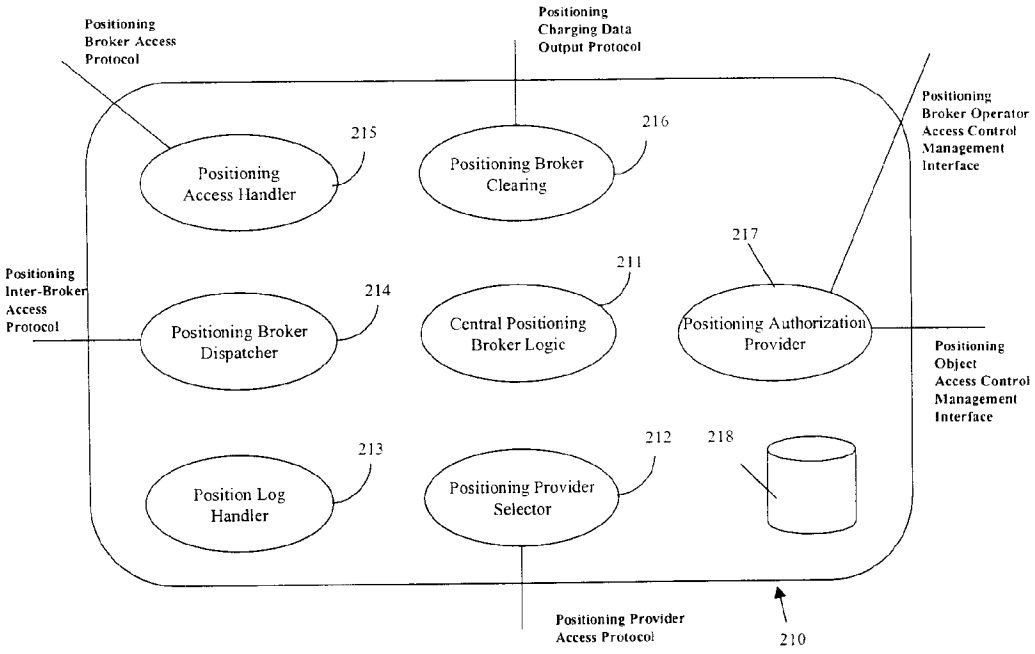

Positioning
Broker Access
Protocol
Positioning
Charging Data
Output Protocol
Positioning
Broker Operator
Access Control
Management
Interface
215
Positioning
Access Handler
216
Positioning Broker
Clearing
217
211
Positioning
Inter-Broker
Access
Protocol
214
Positioning Broker
Dispatcher
Central Positioning
Broker Logic
Positioning Authorization
Provider
Positioning
Object
Access Control
Management
Interface
213
212
218
Position Log
Handler
Positioning Provider
Selector
Positioning Provider
Access Protocol
210

Fig. 2

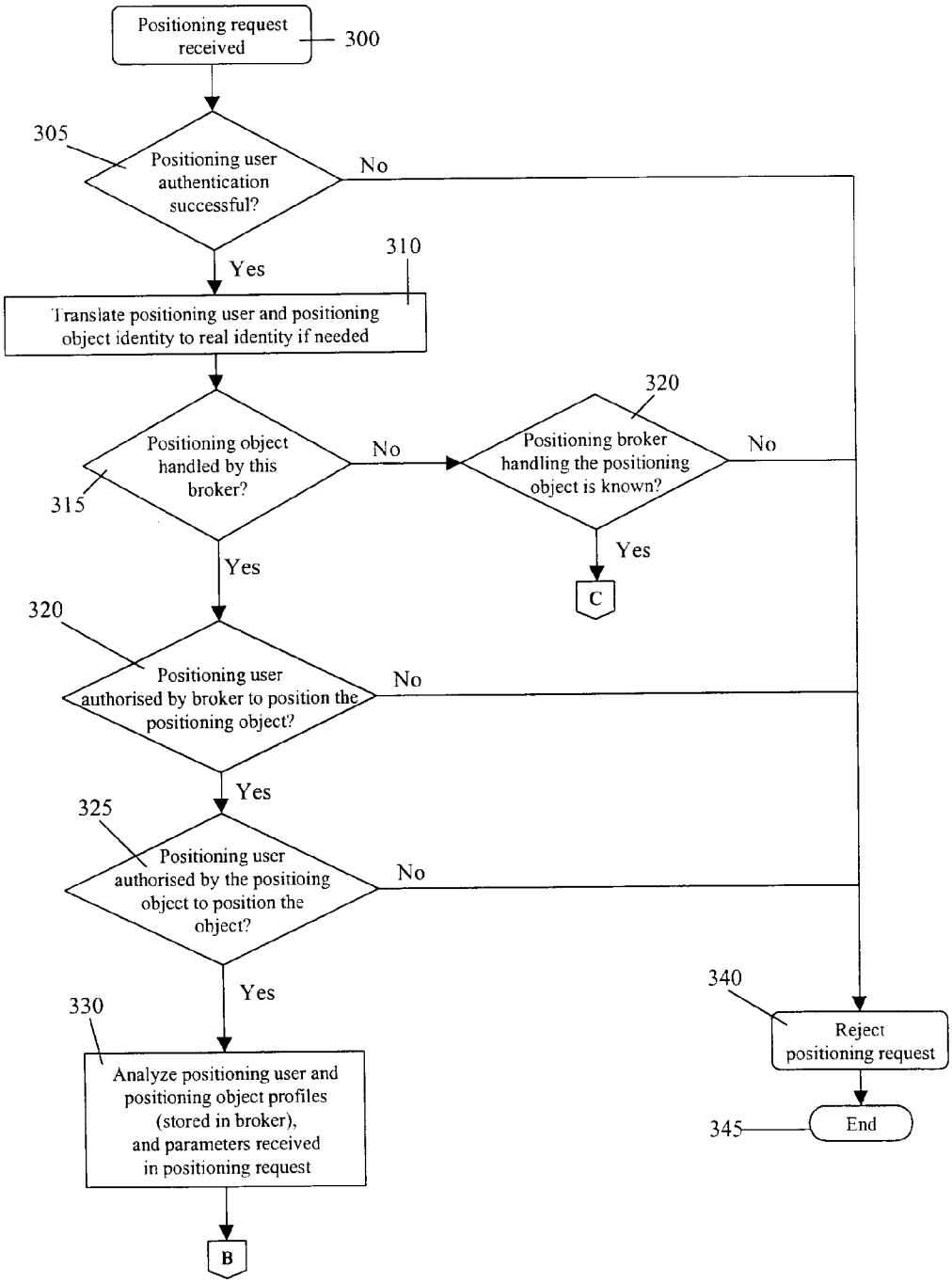

Positioning request received
300
305
Positioning user authentication successful?
No
Yes
310
Translate positioning user and positioning object identity to real identity if needed
Positioning object handled by this broker?
315
No
320
Positioning broker handling the positioning object is known?
No
Yes
C
Yes
320
Positioning user authorised by broker to position the positioning object?
No
Yes
325
Positioning user authorised by the positioing object to position the object?
No
Yes
330
Analyze positioning user and positioning object profiles (stored in broker), and parameters received in positioning request
B
340
Reject positioning request
345
End

Fig. 3

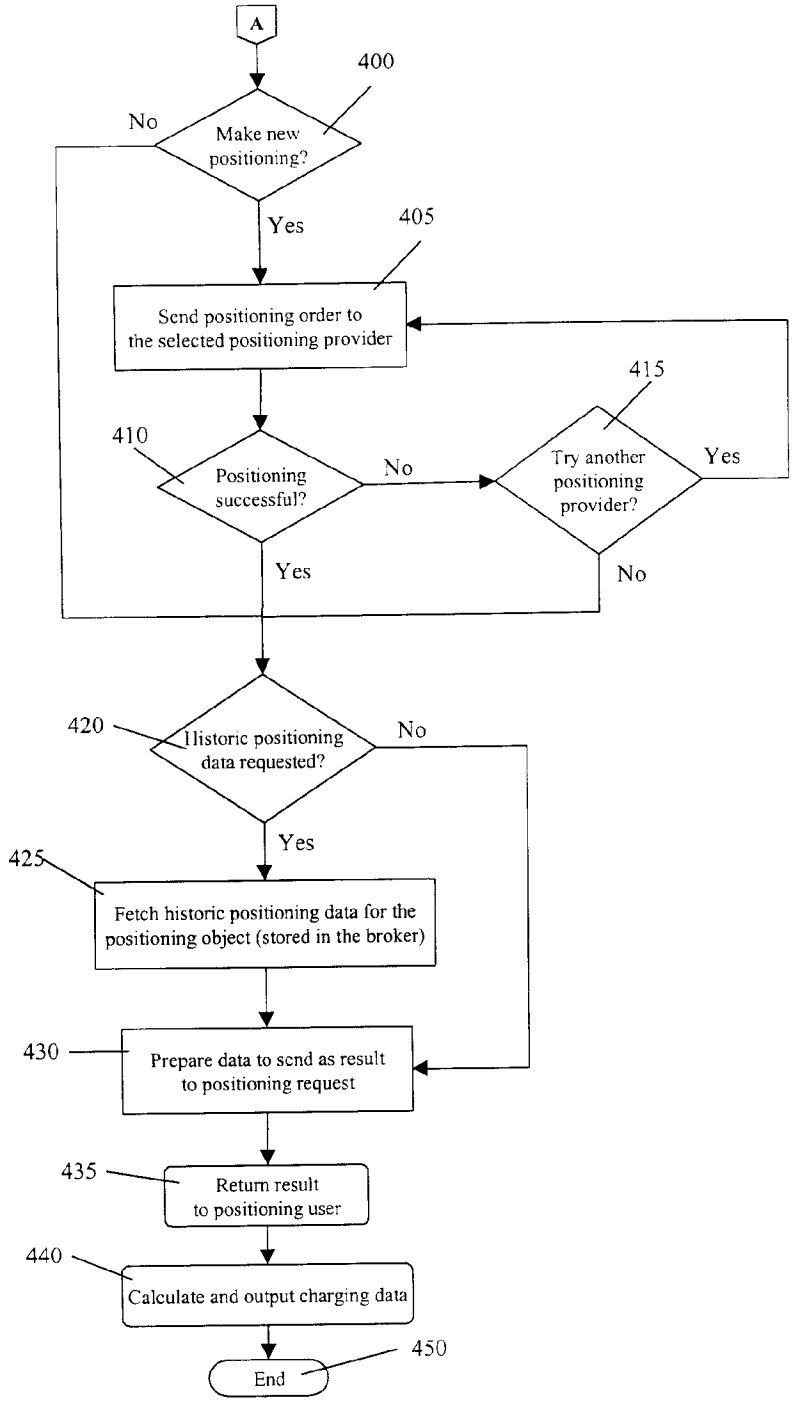

A
400
Make new positioning?
No
Yes
405
Send positioning order to the selected positioning provider
415
410
Positioning successful?
No
Try another positioning provider?
Yes
Yes
No
420
Historic positioning data requested?
No
Yes
425
Fetch historic positioning data for the positioning object (stored in the broker)
430
Prepare data to send as result to positioning request
435
Return result to positioning user
440
Calculate and output charging data
450
End

Fig. 4

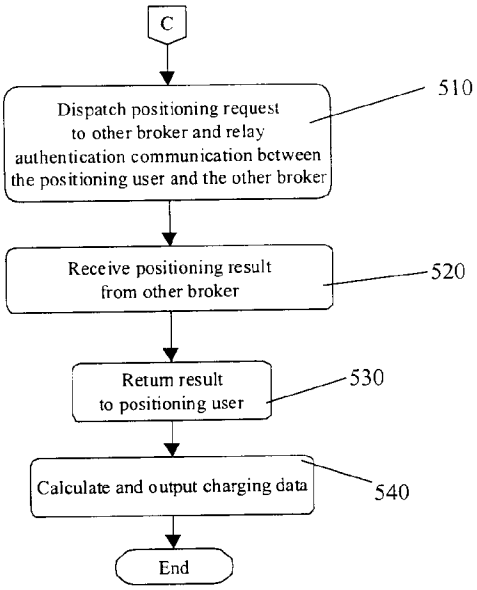

C
Dispatch positioning request to other broker and relay authentication communication between the positioning user and the other broker
510
Receive positioning result from other broker
520
Return result to positioning user
530
Calculate and output charging data
540
End

Fig. 5

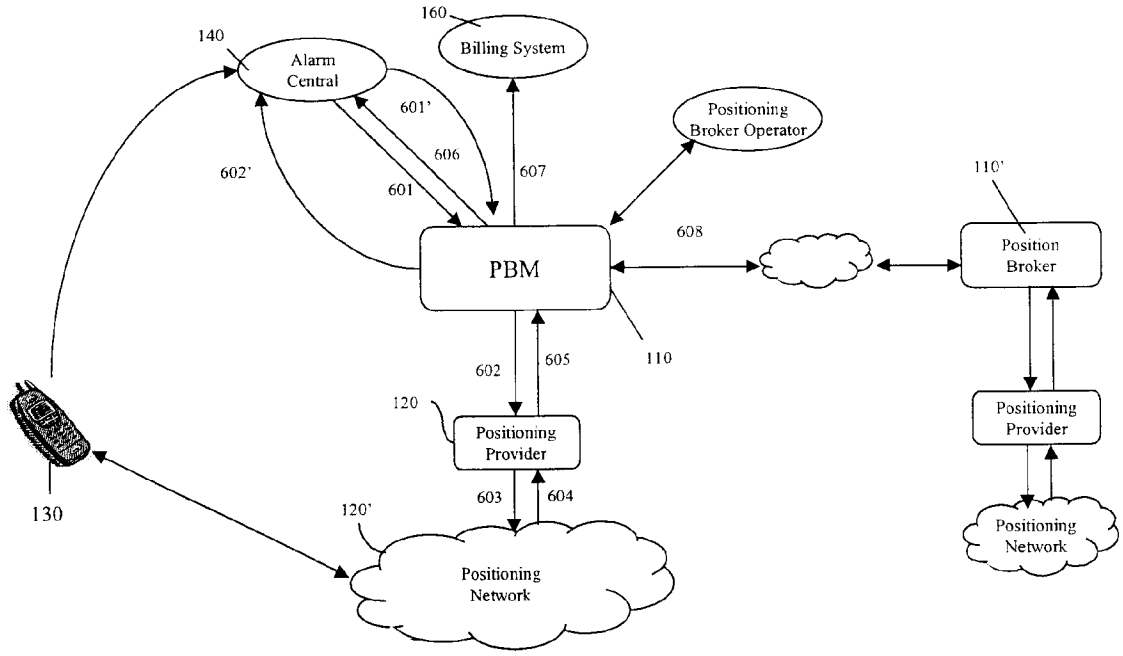

160
Billing System
140
Alarm Central
601'
606
602'
601
607
Positioning Broker Operator
110'
608
PBM
Position Broker
602
605
110
120
Positioning Provider
Positioning Provider
130
603
604
120'
Positioning Network
Positioning Network

Fig. 6

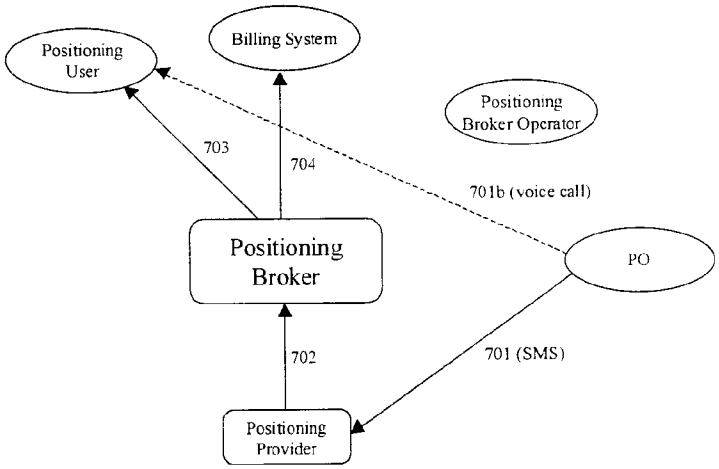
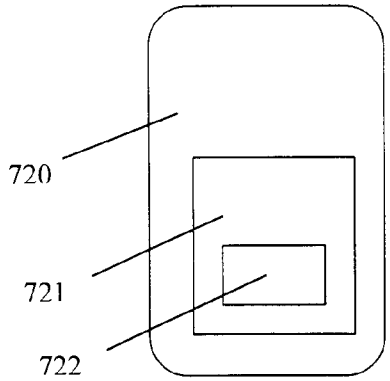

Positioning User
Billing System
Positioning Broker Operator
703
704
701b (voice call)
Positioning Broker
PO
702
701 (SMS)
Positioning Provider

Fig. 7


720
721
722

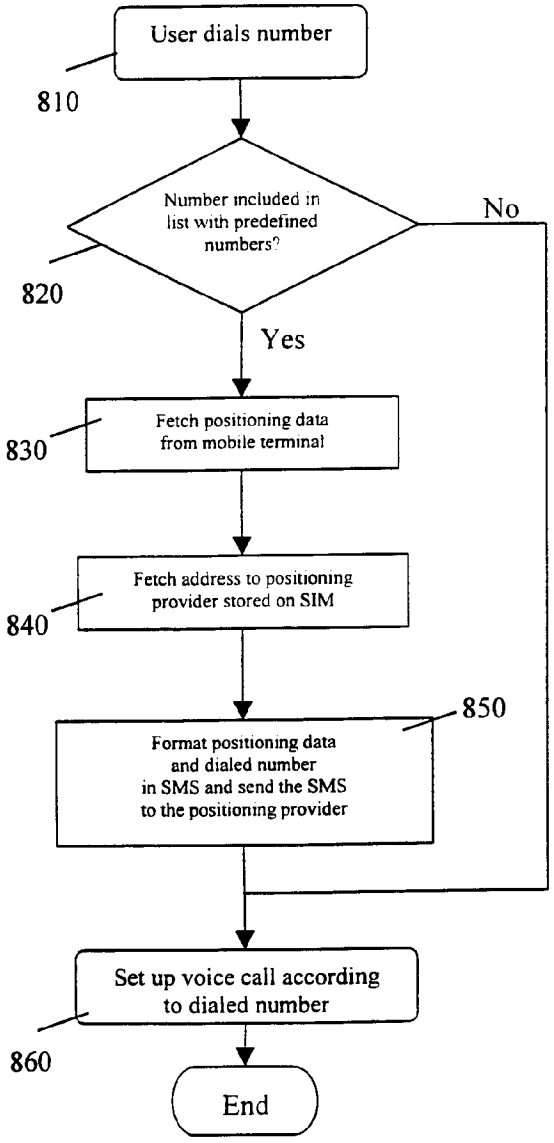

User dials number
810
Number included in list with predefined numbers?
820
No
Yes
Fetch positioning data from mobile terminal
830
Fetch address to positioning provider stored on SIM
840
Format positioning data and dialed number in SMS and send the SMS to the positioning provider
850
Set up voice call according to dialed number
860
End

Fig. 8

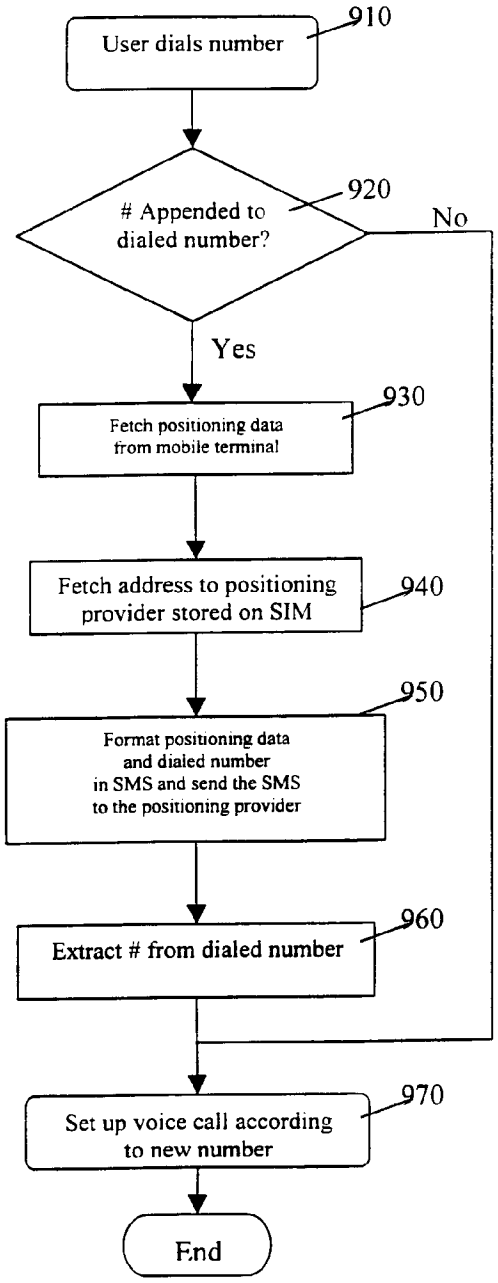

User dials number
910
Appended to dialed number?
920
No
Yes
Fetch positioning data from mobile terminal
930
Fetch address to positioning provider stored on SIM
940
Format positioning data and dialed number in SMS and send the SMS to the positioning provider
950
Extract # from dialed number
960
Set up voice call according to new number
970
End

Fig. 9

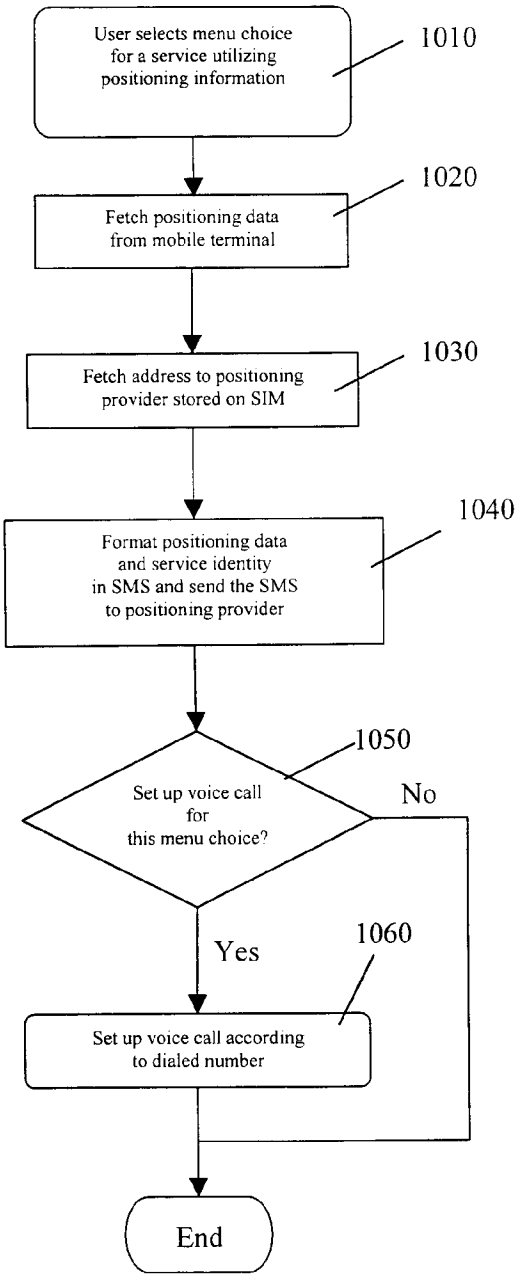

User selects menu choice for a service utilizing positioning information
1010
Fetch positioning data from mobile terminal
1020
Fetch address to positioning provider stored on SIM
1030
Format positioning data and service identity in SMS and send the SMS to positioning provider
1040
Set up voice call for this menu choice?
1050
No
Yes
1060
Set up voice call according to dialed number
End

Fig. 10

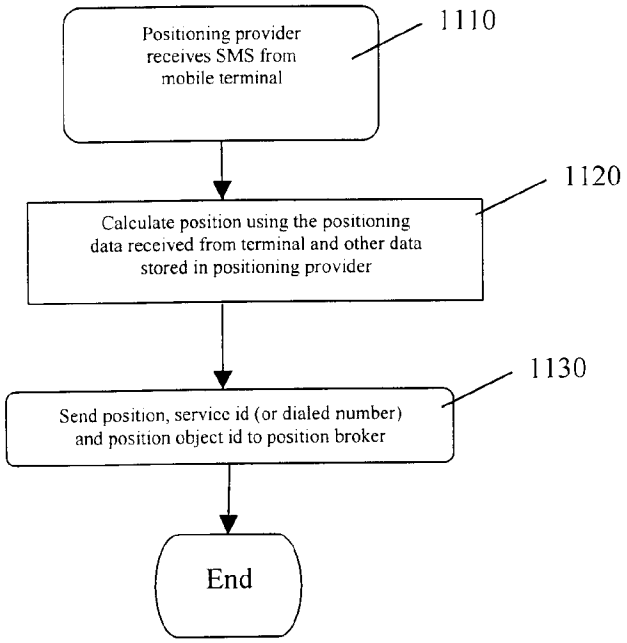

Positioning provider receives SMS from mobile terminal
1110
Calculate position using the positioning data received from terminal and other data stored in positioning provider
1120
Send position, service id (or dialed number) and position object id to position broker
1130
End

Fig. 11

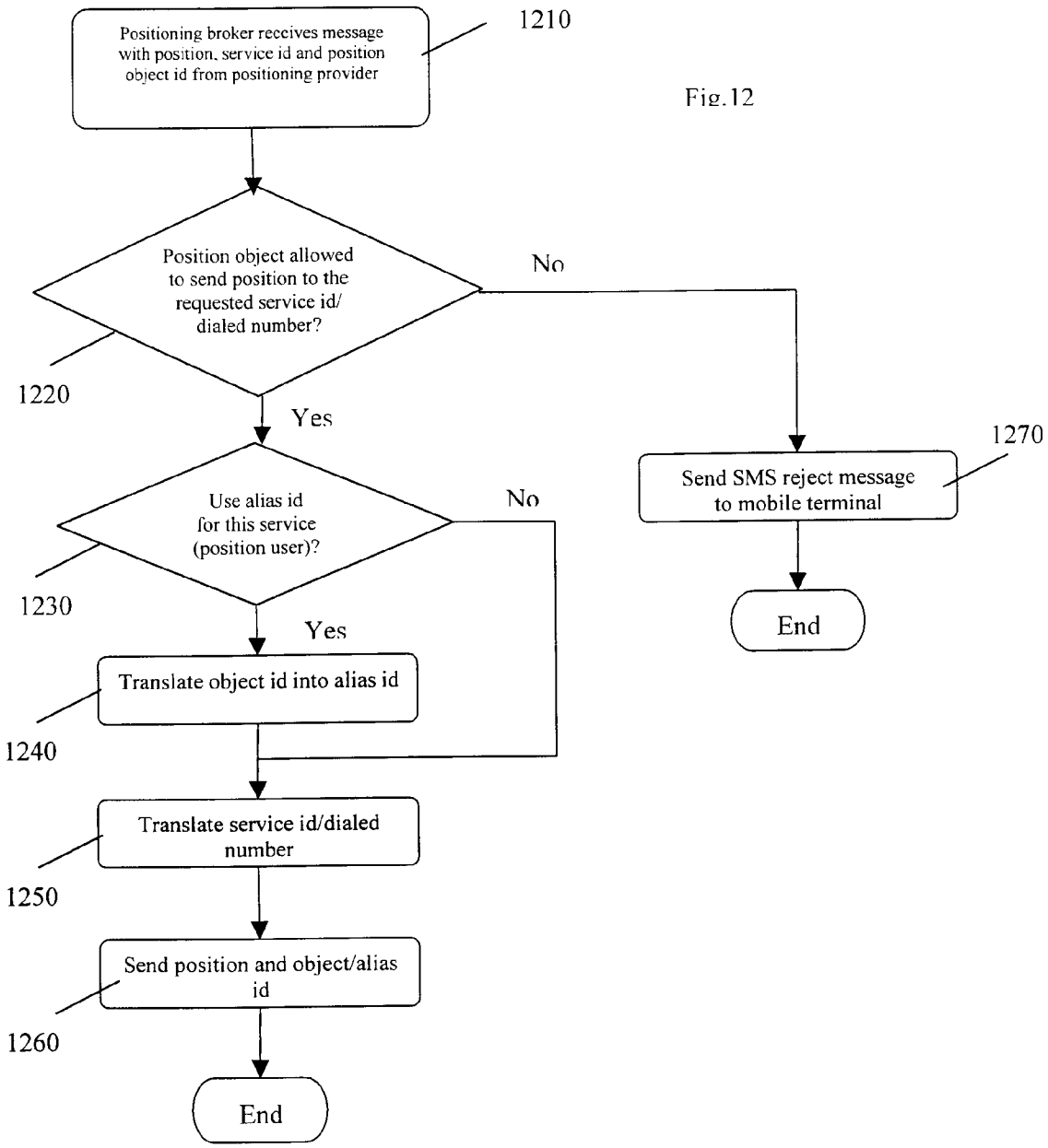

Positioning broker receives message with position, service id and position object id from positioning provider
1210
Position object allowed to send position to the requested service id/ dialed number?
1220
No
Yes
Send SMS reject message to mobile terminal
1270
End
Use alias id for this service (position user)?
1230
No
Yes
Translate object id into alias id
1240
Translate service id/dialed number
1250
Send position and object/alias id
1260
End

Fig.12